

# ESU 009– Classification of nutraceuticals compounds microbes and minerals

## Lecture 10



# Microbes (probiotics)

- Where the other groupings of nutraceuticals involve molecules or elements, probiotics involves intact microorganisms.
- This group largely includes bacteria, and its criteria are that a microbe must be resistant to:
  - ✓ Acid conditions of the stomach, bile, and digestive enzymes normally found in the human gastrointestinal tract
  - ✓ Able to colonize the human intestine
  - ✓ Be safe for human consumption;
  - ✓ Have scientifically proven efficacy
- Among the bacterial species recognized as having functional food potential are *Lactobacillus acidophilus*, *L. plantarum*, *L. casei*, *Bifidobacterium bifidum*, *B. infantis*, and *Streptococcus salvarius* subspecies *thermophilus*.

# BENEFICIAL PROBIOTIC STRAINS

## BIFIDOBACTERIUM BIFIDUM

the most dominant probiotic in infants and in the large intestine. Supports production of vitamins in gut, inhibits harmful bacteria, supports immune system response and prevent diarrhea.

## LACTOBACILLUS ACIDOPHILUS

relieves gas, bloating, improves lactose intolerance. Shown 61% reduction in e. coli, lower cholesterol levels, and creating of vitamin K. Also, important in GALT immune strength.

## BACILLUS COAGULANS

an endospore probiotic that is heat resistant and improves nutrient absorption. Also has been shown to reduce inflammation and symptoms of arthritis.

## BIFIDOBACTERIUM LONGUM

supports liver function, reduces inflammation, removes lead and heavy metals.

## LACTOBACILLUS CASEI

supports immunity, inhibits h. pylori, and helps fight infections.

## BIFIDOBACTERIUM INFANTIS

alleviates IBS symptoms, diarrhea, and constipation.

## LACTOBACILLUS BREVIS

shown to survive the GI tract, boost cellular immunity, enhanced natural T-killer cells, and kill h. pylori bacteria.

## BIFIDOBACTERIUM BREVE

helps colonize healthy gut community and crowd out bad bacteria.

## BACILLUS SUBTILIS

an endospore probiotic that is heat resistant. Elicits a potent immune response and supports GALT. Suppresses growth of bad bacteria like salmonella and other pathogens.

## LACTOBACILLUS BULGARICUS

a powerful probiotic strain that has been shown to fight harmful bacteria that invades your digestive system and is stable enough to withstand the acidic digestive juices of the stomach. It also neutralizes toxins and naturally produces its own antibiotics.

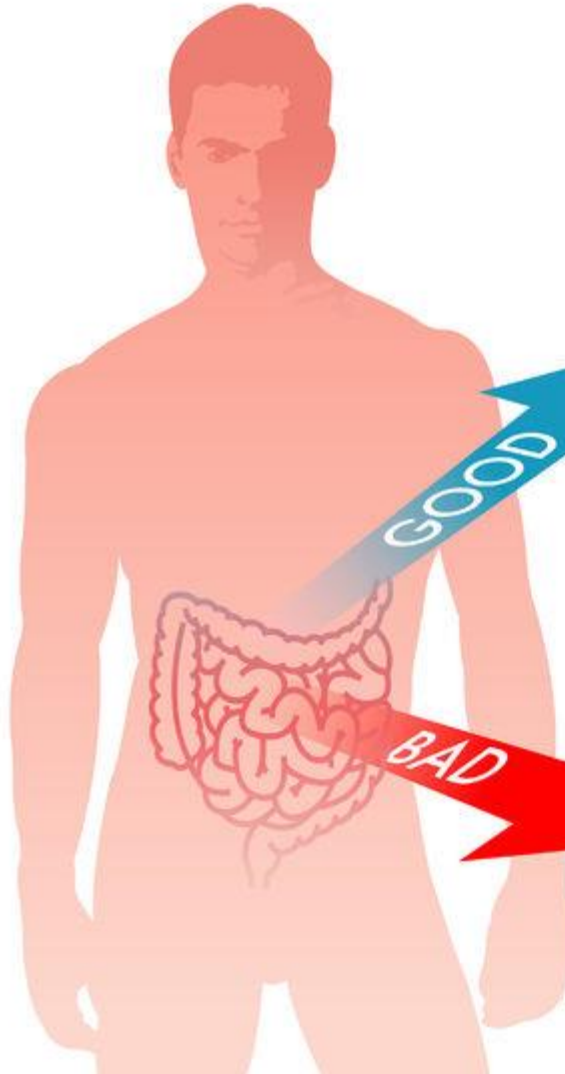
## LACTOBACILLUS RHAMNOSUS

supports bacterial balance and supports healthy skin. Helps fight urinary tract infections, respiratory infections, and reduce anxiety by reducing stress hormones and GABA neurotransmitter receptors. Also, survives GI tract.

## SACCHAROMYCES BOULARDII

a yeast probiotic strain that restores natural flora in the large and small intestine and improves intestinal cell growth. It has proven effective in treating inflammatory bowel disease like Crohn's disease. It's been shown to have anti-toxin effects, be antimicrobial, and reduce inflammation.

## Good and Bad Bacterial Flora



### BIFIDOBACTERIA

The various strains help to regulate levels of other bacteria in the gut, modulate immune responses to invading pathogens, prevent tumour formation and produce vitamins.



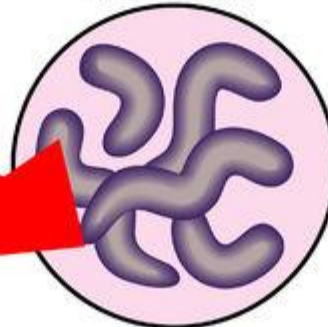
### ESCHERICHIA COLI

Several types inhabit the human gut. They are involved in the production of vitamin K2 (essential for blood clotting) and help to keep bad bacteria in check. But some strains can lead to illness.



### LACTOBACILLI

Beneficial varieties produce vitamins and nutrients, boost immunity and protect against carcinogens.



### CAMPYLOBACTER

C Jejuni and C coli are the strains most commonly associated with human disease. Infection usually occurs through the ingestion of contaminated food.



### ENTEROCOCCUS FAECALIS

A common cause of post-surgical infections.



### CLOSTRIDIUM DIFFICILE

Most harmful following a course of antibiotics when it is able to proliferate.

# MINERALS

- Several minerals have been recognized for their nutraceutical potential and thus become candidates for functional food recipes.
- Among the most obvious is calcium with relation to bone health, colon cancer, and perhaps hypertension and cardiovascular disease.
- Potassium has also been purported to reduce hypertension and thus improve cardiovascular health.

# Inorganic Mineral Supplement

- ✚ Calcium
- ✚ Magnesium
- ✚ Manganese
- ✚ Boron
- ✚ Copper
- ✚ Zinc
- ✚ Phosphorus



- Calcium: Essential for bone and teeth, maintaining bone strength, nerve, muscle and glandular function, blood clotting.
- Iron: Energy production, Hb, oxygen transport.
- Magnesium: For healthy nerve and muscle function, bone formation.
- Phosphorous: Energy production, phosphorylation process, bone and teeth, for genetic material.

- **Cobalt**: Component of vit. B 12 and B 12 coenzymes.
- **Copper**: Hb and collagen production, function of **heart, energy production, absorption of iron.**
- **Iodine**: Proper function of **thyroid gland.**
- **Chromium**: With insulin it helps in **conversion of carbohydrate and fat into energy, treatment of diabetes.**
- **Selenium**: **Antioxidant**, functioning of heart muscle, part of GPX enzyme,
- **Zinc**: Essential for **cell reproduction**, for development in **Neonates**, wound healing, production of sperm and testosterone hormone,



# Thank you

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